

# Yuan Cao

## Curriculum Vitae

77 Massachusetts Ave.

Cambridge 02139, MA

☎ +1 (617) 749 8575

✉ caoyuan@mit.edu

🌐 [web.mit.edu/caoyuan/www/](http://web.mit.edu/caoyuan/www/)

## Education

- 2016–2020 **Ph. D. in Electrical Engineering**, *Massachusetts Institute of Technology*, Cambridge, USA.
- 2014–2016 **M. S. in Electrical Engineering**, *Massachusetts Institute of Technology*, Cambridge, USA.  
GPA: 5/5
- 2010–2014 **B. Sc in Physics**, *University of Science & Technology of China*, Hefei, China.  
GPA: 3.98/4.3

## Awards and Honors

- 2019 TIME 100 Next for rising stars shaping their industries and the future
- 2018 Nature's 10 'Graphene wrangler', one of ten people who mattered in science in 2018
- 2018 Physics World Breakthrough of the Year Award winner
- 2018 Forbes 30 under 30 Asia
- 2014 Locher Fellowship
- 2013 Guo Moruo Scholarship (Highest honor for USTC undergrad students)
- 2011-2012 National Scholarship
- 2010 Outstanding Freshmen's Scholarship

## Selected Publications

I have published 15 papers in top journals with over 3,800 total citations, including 5 in Nature, 1 in Science, 2 in Nature Nanotechnology, 3 in Physical Review Letters, 2 in Physical Review B, among others. Currently I have an h-index of 12 (Google Scholar). Below are selected publications of mine.

2020 **Y. Cao**, D. Rodan-Legrain, O. Rubies-Bigorda, J. M. Park, K. Watanabe, T. Taniguchi, P. Jarillo-Herrero, *Tunable correlated states and spin-polarized phases in twisted bilayer-bilayer graphene*. Nature **583**, 215-220 (2020).

**Y. Cao\***, D. Chowdhury\*, D. Rodan-Legrain, O. Rubies-Bigorda, K. Watanabe, T. Taniguchi, T. Senthil P. Jarillo-Herrero, *Strange metal in magic-angle graphene with near Planckian dissipation*. Phys. Rev. Lett. **124**, 076801 (2020).

A. Uri\*, S. Grover\*, **Y. Cao\***, D. Rodan-Legrain, Y. Myasoedov, K. Watanabe, T. Taniguchi, P. Moon, M. Koshino, P. Jarillo-Herrero, E. Zeldov, *Mapping the twist-angle disorder and Landau levels in magic-angle graphene*. Nature **581**, 47-52 (2020).

U. Zondiner\*, A. Rozen\*, D. Rodan-Legrain\*, **Y. Cao**, R. Queiroz, T. Taniguchi, K. Watanabe, Y. Oreg, F. von Oppen, A. Stern, E. Berg, P. Jarillo-Herrero, S. Ilani. *Cascade of phase transitions and Dirac revivals in magic-angle graphene*. Nature **582**, 203-208 (2020).

- 2019 S. L. Tomarken, **Y. Cao**, A. Demir, K. Watanabe, T. Taniguchi, P. Jarillo-Herrero, R. C. Ashoori, *Electronic compressibility of magic-angle graphene superlattices*. Phys. Rev. Lett. **123**, 046601 (2019).  
Q. Ma, C. H. Lui, J. C. W. Song, Y. Lin, J. F. Kong, **Y. Cao**, T. H. Dinh, *et. al.* *Giant intrinsic photoresponse in pristine graphene*. Nature Nanotechnology **14**, 145-150 (2019).
- 2018 **Y. Cao**, V. Fatemi, S. Fang, K. Watanabe, T. Taniguchi, E. Kaxiras, P. Jarillo-Herrero, *Unconventional superconductivity in magic-angle graphene superlattices*. Nature **556**, 43-50 (2018).  
**Y. Cao**, V. Fatemi, A. Demir, S. Fang, S. L. Tomarken, J. Y. Luo, J. D. Sanchez-Yamagishi, K. Watanabe, T. Taniguchi, E. Kaxiras, R. C. Ashoori, P. Jarillo-Herrero, *Correlated insulator behaviour at half-filling in magic-angle graphene superlattices*. Nature **556**, 80-84 (2018).  
V. Fatemi, S. Wu, **Y. Cao**, L. Bretheau, Q. D. Gibson, K. Watanabe, T. Taniguchi, R. J. Cava, P. Jarillo-Herrero, *Electrically tunable low-density superconductivity in a monolayer topological insulator*. Science **362**, 926-929 (2018).
- 2017 Y. Bie, G. Grosso, M. Heuck, M. M. Furchi, **Y. Cao**, J. Zheng, *et. al.* *A MoTe<sub>2</sub>-based light-emitting diode and photodetector for silicon photonic integrated circuits*. Nature Nanotechnology **12**, 1124-1129 (2017).
- 2016 **Y. Cao**, J. Y. Luo, V. Fatemi, S. Fang, J. D. Sanchez-Yamagishi, K. Watanabe, T. Taniguchi, E. Kaxiras, P. Jarillo-Herrero, *Superlattice-induced insulating states and valley-protected orbits in twisted bilayer graphene*. Phys. Rev. Lett. **117**, 116804 (2016).
- 2014 **Y. Cao**, X. G. Li, D. L. Wang, X. D. Fan, X. B. Lu, Z. Y. Zhang, C. G. Zeng, Z. Y. Zhang, *Highly anisotropic hybridization, dispersion, damping, and propagation of quantum plasmons in graphene superlattices*. Physical Review B **90**, 245415 (2014).  
**Yuan Cao**, Z. J. Ding. *Formation of hexagonal pattern of ferrofluid in magnetic field*. J. Magnetism & Magnetic Materials **355**, 93-99 (2014).

---

## Research

- 2014–2020 **Physics of Moiré Superlattices**, *Jarillo-Herrero group, MIT, Cambridge*.  
Our study is mainly on electronic transport in twisted 2-dimensional structures that have a moiré pattern. My research in twisted bilayer graphene has led to a published paper in Physical Review Letters in 2016 and two Nature papers in 2018, among others. Our work in magic-angle twisted bilayer graphene has stimulated extensive interest from the entire condensed matter community, and opened a new field known as 'twistronics'.
- 2012–2014 **Plasmonics properties of graphene**, *Zeng group, USTC, Hefei, China*.  
We theoretically studied the effect of superlattice on graphene and its plasmonic properties. The results are published in Physical Review B in 2014.

---

## Invited Talks

- Aug 2020 Kavli Institute for Theoretical Physics, UCSB (online)  
Jul 2020 Condensed-matter seminar, Princeton University (online)  
Apr 2020 Chez Pierre seminar, MIT (online)  
May 2019 Frontiers in Quantum Materials and Devices workshop, Tokyo University, Japan  
Dec 2018 Seminar at University of Science and Technology of China, China  
Nov 2018 Seminar at Weizmann Institute of Science, Israel  
Oct 2018 Seminar at Hebrew University at Jerusalem, Israel  
Jun 2018 Gordon Research Conference, Massachusetts

May 2018 Seminar at Florida State University/Maglab, Florida

Apr 2018 Seminar at Brown University, Rhode Island

## Computer skills

- C/C++, Java
- Python, Perl, PHP
- Julia
- MATLAB, Labview
- $\LaTeX$

## Languages

- English
- Japanese
- Chinese

## Hobbies

Astro-photography Shooting planets, galaxies and nebulae with astro camera and telescope.

Music Piano & Violin, Classic Music

